

No. 708,800.

Patented Sept. 9, 1902.

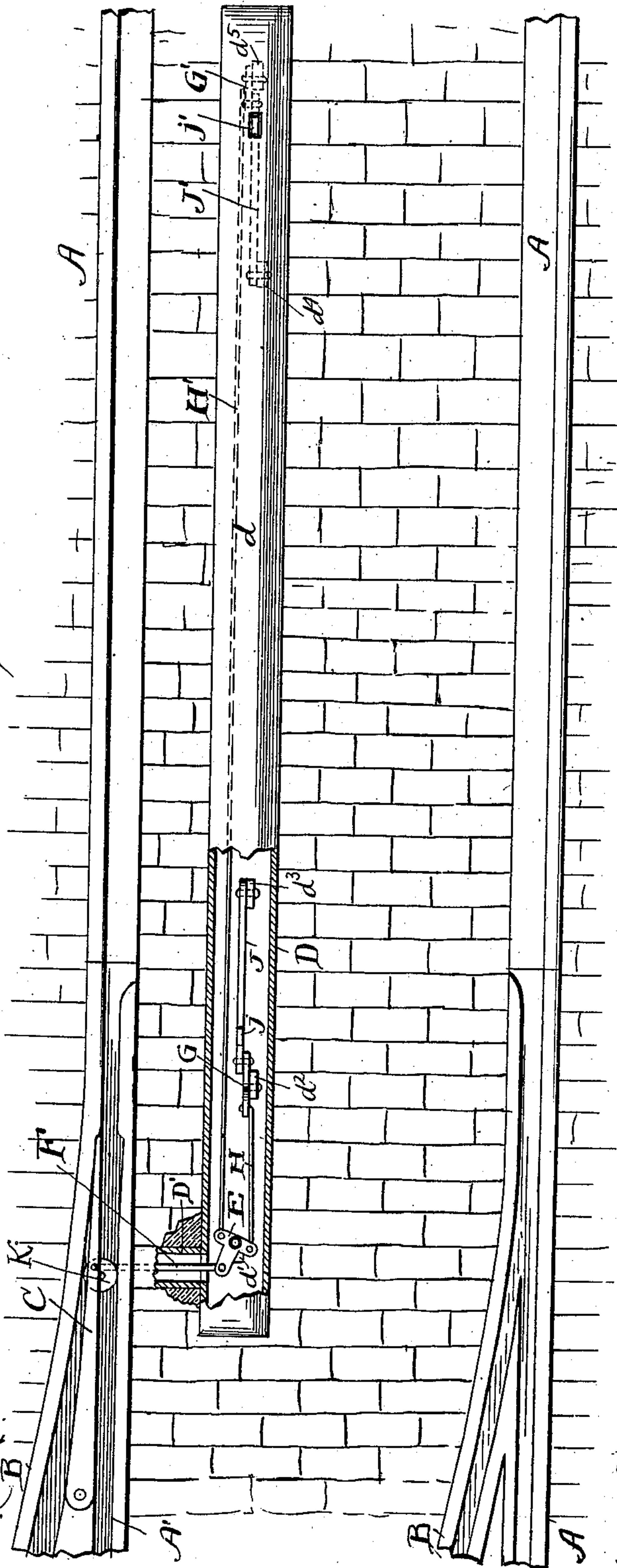
E. CRAPPER, JR.  
RAILWAY SWITCH OPERATING MECHANISM.

(Application filed Oct. 22, 1901.)

(No Model.)

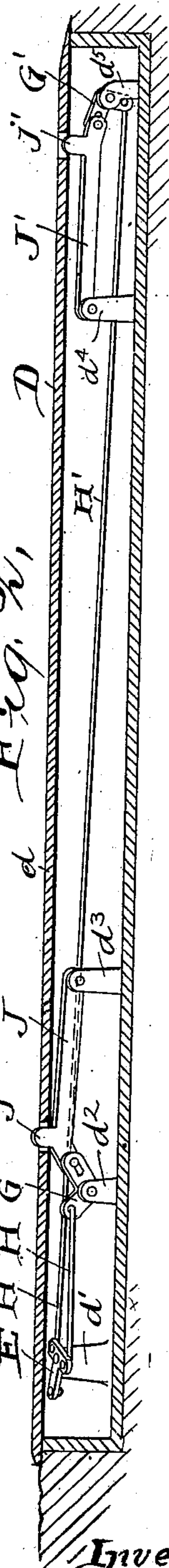
2 Sheets—Sheet 1

*Fig. 1*



Witnesses.  
E. B. Gleichert  
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*Fig. 2*



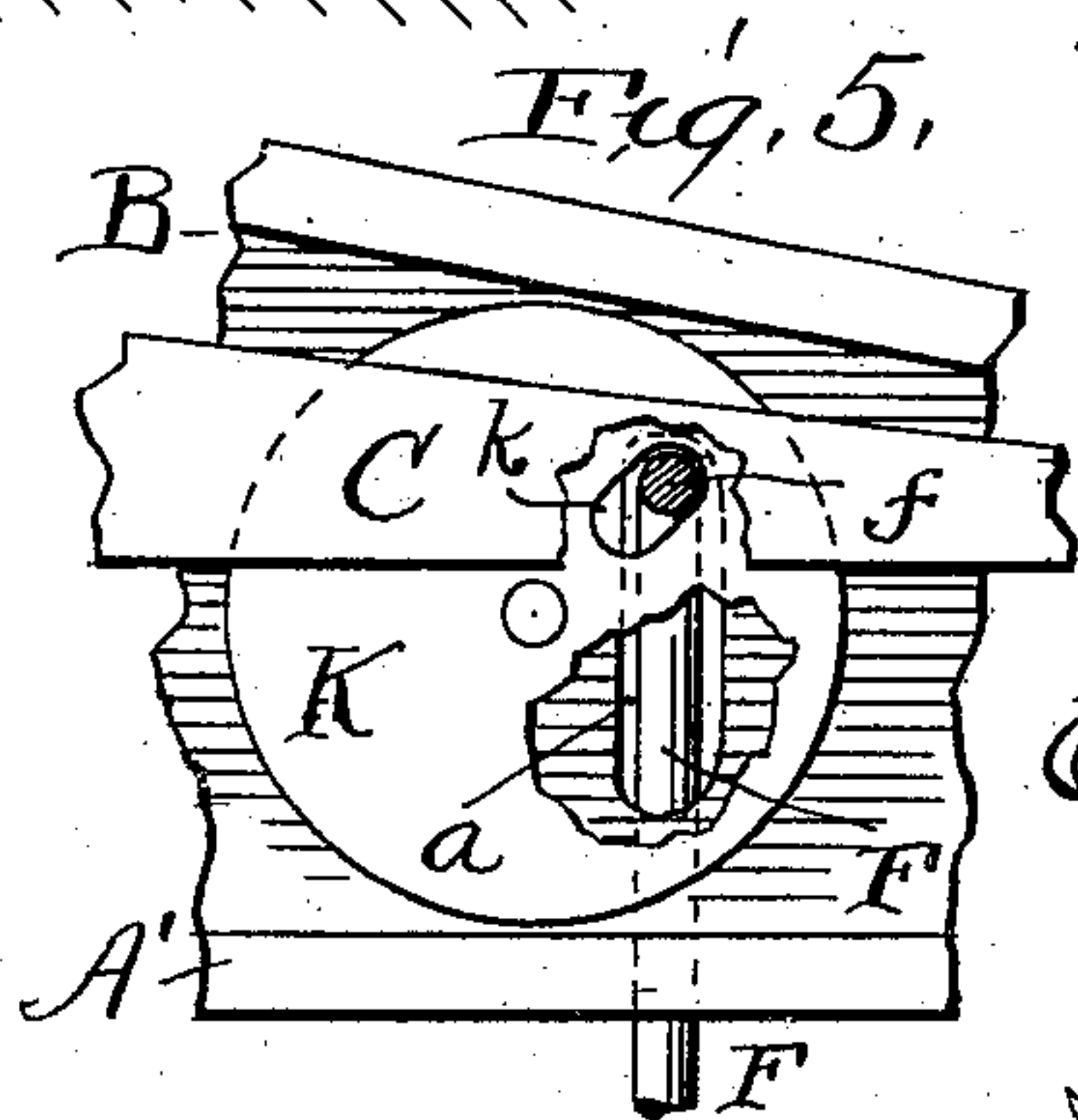
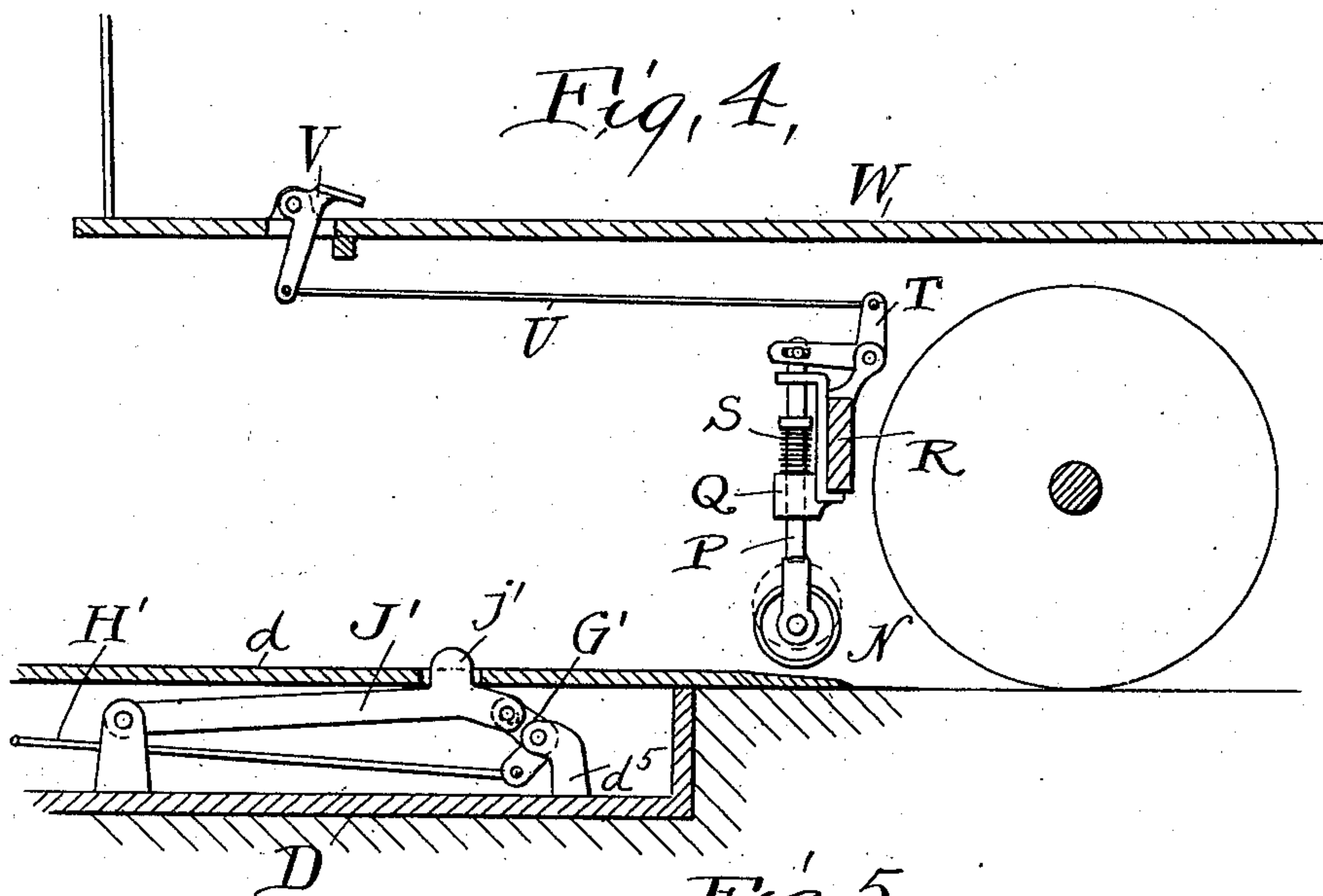
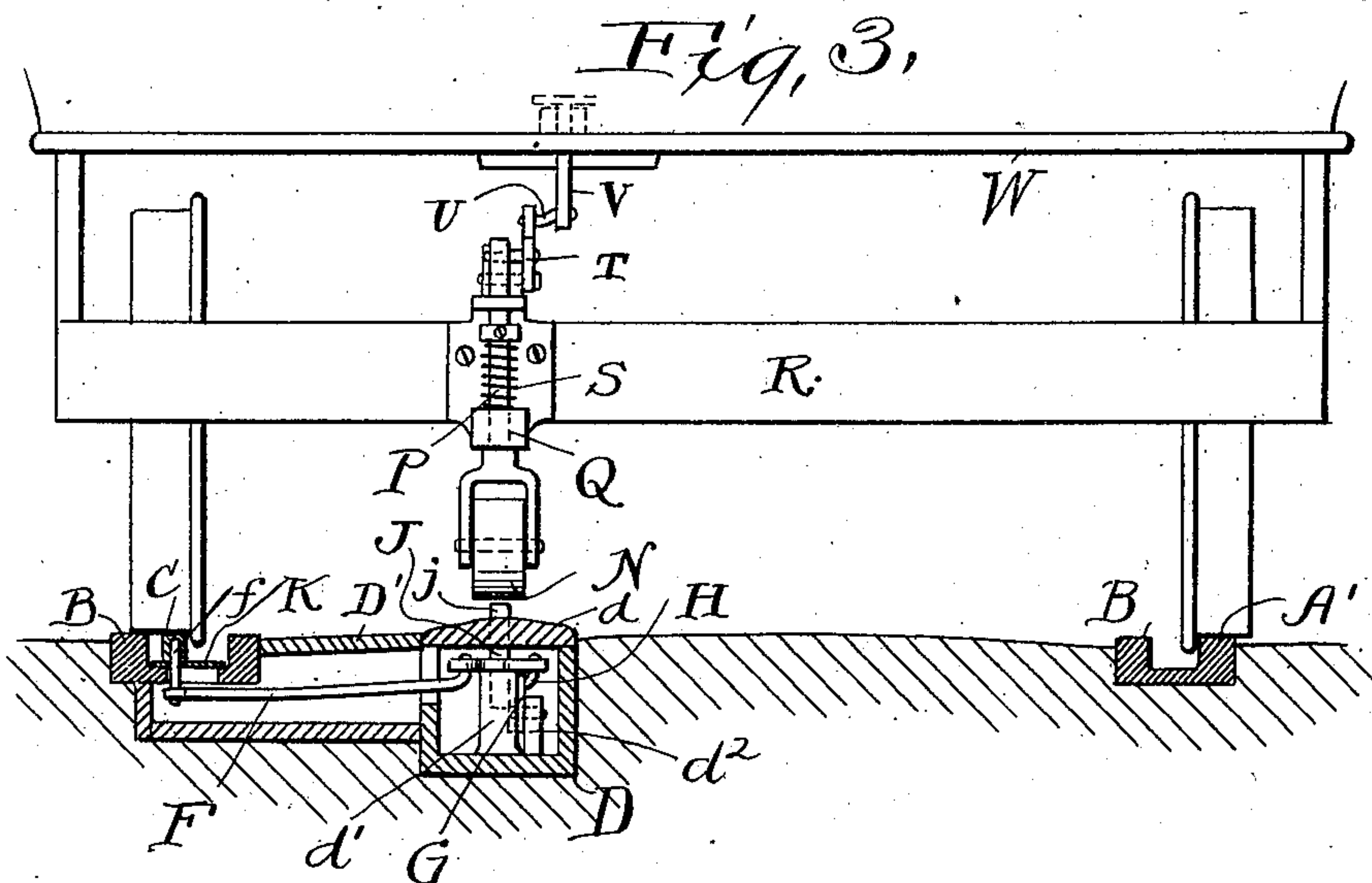
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2 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE.

EBENEZER CRAPPER, JR., OF AKRON, OHIO, ASSIGNOR OF ONE-HALF TO  
JOHN A. BLACK, OF AKRON, OHIO.

## RAILWAY-SWITCH-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 708,800, dated September 9, 1902.

Application filed October 22, 1901. Serial No. 79,540. (No model.)

*To all whom it may concern:*

Be it known that I, EBENEZER CRAPPER, JR., a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented a certain new and useful Improvement in Railway-Switch-Operating Mechanisms, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

10 This invention relates to mechanism whereby a railway-switch may be thrown by the moving car approaching the switch, so that without stopping the car the motorman may guide it in the desired direction.

15 The invention is particularly adapted for street-railway service. Its object is to provide a switch-throwing mechanism which shall be extremely simple in construction and positive in action and not liable to be deranged or thrown out of operation by weather conditions or by passing teams, &c.

20 The invention may be most conveniently summarized as consisting of the construction and combination of parts to this end, as hereinafter described, and definitely set out in the claims.

The drawings clearly illustrate the invention.

30 Figure 1 is a plan of a street-railway track with the invention applied thereto. Fig. 2 is a longitudinal vertical section showing the operating mechanism slightly in perspective. Fig. 3 is a vertical transverse section through the switch-point and operating mechanism, showing the approaching car. Fig. 4 is a vertical longitudinal section through portions of such car and switching mechanism. Fig. 5 is an enlarged plan of a portion of the switch-point and its adjacent mechanism.

40 The same letters of reference designate the same parts in each figure.

Referring to the parts by letters, A A represent the track common to both the main and branch tracks; A' A', the continuing main track; B B, the siding or branch track; C, the usual pivoted switch-point adapted to connect either the branch track B or the main track A' with the common track A.

50 D represents a long substantially closed box containing the mechanism which is engaged by the car and having the upper sur-

face of its top or cover  $d$ , slightly raised above the surface of the adjacent pavement, as shown. At its forward end this box has a branch tubular connection D', containing the connection to the switch-point. 55

Within the box D, near the branch D', is a vertical standard  $d'$ . On the upper face of this is horizontally pivoted the three-arm lever E. This lever has its forward arm connected by a link F and a pin  $f$ , rising from the end thereof, with the switch-point C, from which it follows that if this lever E is swung on its pivot the switch-point will be correspondingly shifted. 60

Rising from the base of the box D, a short distance behind the standard  $d'$ , are a pair of standards  $d^2 d^3$ . To the former of these is pivoted on a horizontal pivot the bell-crank lever G, which is connected by a link H with one of the arms of the lever E. Pivoted to the standard  $d^3$  is the arm J, which at its forward end has a pin-and-slot connection with the rearward arm of the bell-crank G. This lever J has a toe  $j$ , projecting upward through a slot in the top plate of the box D. Now if this toe is depressed the forward end of the lever J is thereby forced downward, and this carries downward the rear end of the bell-crank G, drawing its forward end and the link H rearward, and this swings the lever E and shifts the switch-point accordingly. 65 70 80

Near the rear end of the box D are the standards  $d^4 d^5$ . To the former of these and extending rearward is pivoted the lever J', having the toe  $j'$ , adapted to extend through an opening in the top plate  $d$ , and the rear end of this lever has a pin-and-slot connection with a bell-crank G', pivoted to the standard  $d^5$  and having its lower arm connected by a link H' with the other arm of the lever E. From this it results that if the toe  $j'$  is forced downward the link H' is drawn rearward, and this shifts the lever E, and hence the switch-point. Now whenever the lever E is shifted in one direction through the pull on the link H or H', as the case may be, that lever pulls the other of these links and raises the corresponding toe or projection  $j$  or  $j'$ . For example, as shown in the drawings, the depression of the forward projection  $j$  shifts the switch-point to connect in the branch track 85 90 95 100



B, and the depression of the rear projection  $j'$  shifts the switch-point to connect in the main track A', wherefore if a car destined for the branch track is approaching the point C and the point is set for the main track, as shown in the drawings, the motorman depresses the forward toe  $j$ , which shifts the switch-point to connect in the branch track and simultaneously raises the rear toe  $j'$ . If the following car is destined for the main track, the motorman thereof depresses the rear toe  $j'$ , which shifts the switch-point to connect in the main track and at the same time raises the toe  $j$ . Of course if the switch-point is already in the proper position the motorman lets the mechanism alone. The cars carry a roller adapted to be depressed by the motorman and roll over and depress the toes  $j$  or  $j'$ , as the case may be. Figs. 3 and 4 show a satisfactory arrangement of this roller. There the roller is designated N, and it is carried in the bifurcated lower end of the bar P. This bar is slidably guided, though prevented from turning, by the housing Q, which is shown as carried by a cross-beam R of the car. A spring S, surrounding the bar, gives it a tendency to rise. At the upper end of the bar is a bell-crank T, which connects it by a link U with the foot-lever V, carried by the floor of the car W in the front vestibule thereof. Now with this construction the spring S will normally maintain the roller N elevated in idle position, as indicated by dotted lines in Fig. 4. When, however, the switch-point is in the wrong position, the motorman places his foot on the foot-lever V as the car approaches the switch, and this depresses the roller N onto the top plate  $d$  of the box D. The roller thereupon rolls over the toe  $j'$  or  $j$ , as the case may be, operating the switch-point accordingly. The toes  $j'$  and  $j$  are such distance apart that the motorman may very conveniently depress the roller after passing the first toe in time to engage the second or raise the roller after depressing the first toe without engaging the second even though the car be running rapidly. At the same time the toes  $j'$  and  $j$  are a less distance apart than the length of the car, so that even though cars are following each other as closely as possible one car cannot displace the switch for the car ahead of it.

In order to prevent any undue leakage of water into the box D, its top plate  $d$  is slightly elevated above the surface of the adjacent pavement and is arched over, so that the rain will drain from it. I also secure a plate K over the slot  $a$  in the base of the rail, which

carries the switch-point, through which the pin  $f$  projects. This plate is pivoted at its center to the base of such rail and has itself a slot  $k$ , through which the pin  $f$  projects, this slot coming directly beneath the switch-point C and providing for the difference in curvature between the paths of travel of the pin  $f$  and the corresponding points in the plate K. This plate is out of the way, being in the depression between the rails B and A', and effectively covers the slot  $a$ . The surface of the plate  $d$  being raised above the adjacent pavement, the downward movement of the roller N may be so limited that it can only touch and roll over said plate and not by accident be brought into contact with the rough surface of the pavement at either end of said plate.

Having described my invention, I claim—

1. In a switch-operating mechanism, the combination of a pair of levers located along the track, a pair of bell-cranks connected with and operated by said levers, a three-arm lever located adjacent to the switch-point, a link connecting one arm of the same with the switch-point, and a pair of links connecting the other arms thereof with said bell-cranks, substantially as described.

2. In a switch-operating mechanism, the combination of a switch-point, mechanism located along the track for throwing the same, a link connected with said mechanism and extending beneath the switch-point, said link being connected with the under side of the point, there being a slot through the rail-base within which such point moves, and a pivoted plate covering such slot and having a hole through which said pin projects, substantially as described.

3. In a switch-operating mechanism, the combination of a switch-point, a rail-base in which said point seats, said base having a slot through it, a plate covering said slot above the rail-base, and below the switch-point, said plate being pivoted to said rail-base adjacent to the slot therein, said plate having a slot through it adapted to overlap the slot in the rail-base, a rod shifting said switch-point beneath said rail-base said rod having a pin extending up through both said overlapping slots into the switch-point; substantially as described.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

EBENEZER CRAPPER, JR.

Witnesses:

ALBERT H. BATES,  
JOHN A. BLACK.